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09/822,923	03/30/2001	Matthew E. Frazer	PW 027 3217 P10862	8276

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EXAMINER

WANG, JIN CHENG

ART UNIT	PAPER NUMBER
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2672

DATE MAILED: 06/26/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/822,923

Applicant(s)

FRAZER ET AL.

Examiner

Jin-Cheng Wang

Art Unit

2672



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-11,13-18 and 21-28 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1, 3-11, 13-18, 21-28 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. The amendments filed on 06/06/2003 have been entered. Claims 1, 4-11, 13, and 15-18 have been amended. Claims 2, 12, 19, 20 have been canceled. Claims 21-28 have been newly added.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. The amended Claim 1 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The terms such as "an analysis module", "the calibration window", "the adjacent test windows" shown in the claim are not found in the specification. In addition, the following claim limitation shown in claim 1 is *not* supported by the specification, i.e., "an analysis module to determine analysis data for pixels within the calibration window, based on HSV data array, and to determine test analysis data for a set of adjacent test windows, each of the adjacent test windows having a same shape as a calibration window, where tracking data, to track the selected object, is selected from one of the calibration window and the adjacent test windows having a highest tracking probability."

Art Unit: 2672

4. Claims 3-8, 21-24 are rejected the same way as claim 1 because they do not correct the dependency on claim 1.
5. The amended Claim 9 is rejected the same way as claim 1 because the claim 9 recites similar terms and claim limitation as set forth in claim 1.
6. Claims 10-11, 13-18, 25-28 are rejected the same way as claim 9 because they do not correct the dependency on claim 9.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1, 3-11, 13-18, 20-28 are rejected under 35 U.S.C. 102(e) as being anticipated by Bradski et al. U.S. Pat. No. 6,363,160 (hereinafter Bradski).

9. Claim 1:

Bradski teaches an automated calibration system (figure 1; column 3, lines 34-55) to track a selected object through a series of frames of data (column 7, lines 55-65), comprising:

(a) A display device (e.g., figure 11) to display at least one image frame received from an image input device, wherein the image frame includes a calibration window (column 4, lines 2-60; column 15, lines 13-58; figures 4, 10A and 10B);

Art Unit: 2672

(b) An image selection device to select, via the calibration window, the selected object in the at least one image frame (column 3, lines 59-67, column 4, lines 1-10, and column 7, lines 33-54; column 15, lines 13-58);

(c) An image source device (video source 1102 of figure 11) to provide a hue saturation value (HSV) data array of pixels forming the at least one image frame (column 4, lines 2-57; column 13, lines 45-52; column 15, lines 13-58; figures 3A and 3B); and

(d) An analysis module (the flow diagrams of figures 5, 7 and 9; column 13, lines 55-67; column 14, lines 1-59) to determine analysis data for pixels (column 4, lines 2-57; figures 4, 3A and 3B) within the calibration window (column 5, lines 52-67; column 6, lines 1-44; column 15, lines 13-58; figures 4, 10A and 10B), based on the HSV data array (column 4, lines 2-57; figures 3A and 3B), and determine test analysis data (e.g., window sizing parameters) for a set of adjacent test windows (e.g., search windows or boxes or windows of FIG. 14A displaying images; column 5, lines 52-67; column 6, lines 1-44; column 15, lines 13-58), each of the adjacent test windows (e.g., the moving search windows) having a same shape as the calibration window (e.g., the entire video frame or a calculation region or a search window; column 7, lines 5-55; column 15, lines 13-58), wherein tracking data, to track the selected object (e.g., the selected gestures), is selected from one of the calibration window (e.g., the calculation region) and the adjacent test windows (e.g., the search windows) having a highest tracking probability (i.e., the tracking data such as window location parameters are determined/adjusted and a search window having the largest connected region of a probability distribution and the greatest probability density is selected, column 6, lines 45-67; column 7, lines 55-67; column 8, lines 1-9; column 15, lines 13-58).

Art Unit: 2672

Claim 3:

The claim 3 encompasses the same scope of invention as that of claim 1 except additional claimed limitation of a digital camera. However, Bradski further discloses the claimed limitation of the digital camera (column 4, lines 1-57).

Claim 4:

The claim 4 encompasses the same scope of invention as that of claim 1 except additional claimed limitation of a single device. However, Bradski further discloses the claimed limitation of the single device (figure 1).

Claim 5:

The claim 5 encompasses the same scope of invention as that of claim 1 except additional claimed limitation of the analysis module calculating a mean hue and a standard deviation of a hue of the pixels representing the selected object. However, Bradski further discloses the claimed limitation of the analysis module (figures 5, 7 and 9) calculating a mean hue and a standard deviation of a hue of the pixels representing the colored object (figures 3A, 3B and 4; column 4, lines 2-57, column 10, lines 1-16, column 5, lines 31-63, and column 6, lines 22-44; column 12, lines 1-67).

Claim 6:

The claim 6 encompasses the same scope of invention as that of claim 5 except additional claimed limitation of the selected object not being tracked if the mean hue or the standard deviation of the hue is less than predetermined levels. However, Bradski further discloses the claimed limitation of the colored object not being tracked if the mean hue or the standard

Art Unit: 2672

deviation of the hue is less than predetermined levels (It is apparent that a Gaussian or Chi-Square hue probability distribution of Bradski involves the mean hue or the standard deviation of the hue and search for the area with the greatest probability density involves the motion-tracking processing of not tracking a region where the mean hue or the standard deviation of the hue being less than predetermined levels; figures 3A, 3B and 4; column 4, lines 2-57, column 10, lines 1-16, column 5, lines 1-63, and column 6, lines 22-44; column 8, lines 10-38; column 12, lines 1-67).

Claim 7:

The claim 7 encompasses the same scope of invention as that of claim 1 except additional claimed limitation of the analysis module calculating a mean saturation and a standard deviation of a saturation of the pixels representing the selected object. However, Bradski further discloses the claimed limitation of the analysis module (e.g., figures 5, 7, and 9) calculating a mean saturation and a standard deviation of a saturation of the pixels (e.g., a mean saturation and a standard deviation of a saturation of the pixels is an inherent property of a Gaussian or Chi-Square probability density) representing the colored object (figures 3A, 3B and 4; column 4, lines 2-57, column 10, lines 1-16, column 5, lines 31-63, and column 6, lines 22-44; column 8, lines 10-38; column 12, lines 1-67).

Claim 8:

The claim 8 encompasses the same scope of invention as that of claim 7 except additional claimed limitation of the colored object not being tracked if the mean saturation or the standard deviation of the saturation is less than predetermined levels. However, Bradski further discloses the claimed limitation of the selected object not being tracked if the mean saturation or the

Art Unit: 2672

standard deviation of the saturation is less than predetermined levels (figures 3A, 3B and 4; column 4, lines 2-57, column 10, lines 1-16, column 5, lines 1-63, and column 6, lines 22-44; column 8, lines 10-38; column 10, lines 35-67; column 12, lines 1-67).

10. Claim 9:

The claim 9 encompasses the same scope of invention as that of claim 1 in a method form. The claim is rejected for the same reason as set forth in claim 1.

Claim 10:

The claim 10 encompasses the same scope of invention as that of claim 9 except additional claimed limitation of converting a pixel data array for the at least one image frame from a red-green-blue color space (RGB) data array to the HSV data array. However, Bradski further discloses the claimed limitation of converting a pixel data array for the at least one image frame from a red-green-blue color space (RGB) data array to the HSV data array (column 4, lines 1-57).

Claim 11:

The claim 11 encompasses the same scope of invention as that of claim 28 except additional claimed limitation of applying the pixel data from an entire frame to the pixel-classification look-up map wherein if the amount of the pixels associated with the object is greater than a predetermined amount, the calibration method restarts. However, Bradski further discloses the claimed limitation of applying the pixel data from an entire frame to the pixel-classification look-up map (column 4, lines 45-60) wherein if the amount of the pixels associated

Art Unit: 2672

with the object is greater than a predetermined amount, the calibration method restarts (figures 3A, 3B and 4; column 4, lines 1-61; column 6, lines 5-57; column 10, lines 35-67).

Claim 13:

The claim 13 encompasses the same scope of invention as that of claim 10 except additional claimed limitation of thresholding the HSV data array of pixels and disregarding pixel data for each of the pixels having a product of a saturation coordinate and a value coordinate below a predetermined threshold amount. However, Bradski further discloses the claimed limitation of thresholding the HSV data array of pixels and disregarding pixel data for each of the pixels having a product of a saturation coordinate and a value coordinate below a predetermined threshold amount (From the Bradski's teaching that "Hue values are only accumulated if their corresponding S and V values are above respective S and V thresholds" ..., it can be seen that pixel data with the product of S and V values less than a threshold would be excluded from accumulation to the Hue values. See figures 3A, 3B and 4; column 4, lines 1-57; column 5, lines 1-61; column 10, lines 35-67; column 13, lines 55-67; column 14, lines 1-59).

Claim 14:

The claim 14 encompasses the same scope of invention as that of claim 10 except additional claimed limitation of calculating a mean hue and a standard deviation of a hue of the pixels in the colored object. However, Bradski further discloses the claimed limitation of calculating a mean hue and a standard deviation of a hue of the pixels (The mean hue and standard deviation of a hue values are inherently associated with hue probability density) in the

Art Unit: 2672

colored object (column 4, lines 2-57, column 10, lines 1-16, column 5, lines 31-63, and column 6, lines 22-44; column 8, lines 10-38; column 10, lines 35-67; column 12, lines 1-67).

Claim 15:

The claim 15 encompasses the same scope of invention as that of claim 14 except additional claimed limitation of restarting the calibration method if the mean hue or the standard deviation of the hue is less than predetermined levels. However, Bradski further discloses the claimed limitation of restarting the calibration method (restarting searching) if the mean hue or the standard deviation of the hue is less than predetermined levels (figures 3A, 3B and 4; column 4, lines 2-57, column 10, lines 1-16, column 5, lines 31-63, and column 6, lines 1-44; column 8, lines 10-38; column 10, lines 35-67; column 12, lines 1-67).

Claim 16:

The claim 16 encompasses the same scope of invention as that of claim 10 except additional claimed limitation of calculating a mean saturation and a standard deviation of a saturation of the pixels in the selected object. However, Bradski further discloses the claimed limitation of calculating a mean saturation and a standard deviation of a saturation of the pixels in the selected object (figures 3A, 3B and 4; column 4, lines 2-57, column 10, lines 1-16, column 5, lines 31-63, and column 6, lines 22-44; column 12, lines 1-67).

Claim 17:

The claim 17 encompasses the same scope of invention as that of claim 16 except additional claimed limitation of restarting the calibration method if the mean saturation or the standard deviation of the saturation is less than predetermined levels. However, Bradski further discloses the claimed limitation of restarting the calibration method if the mean saturation or the

Art Unit: 2672

standard deviation of the saturation is less than predetermined levels (figures 3A and 3B; column 4, lines 2-57, column 10, lines 1-16, column 5, lines 31-63, and column 6, lines 22-44; column 12, lines 1-67).

Claim 18:

The claim 18 encompasses the same scope of invention as that of claim 10 except additional claimed limitation of allowing the user to select the selected object. However, Bradski further discloses the claimed limitation of allowing the user to select the selected object (column 4, lines 1-57; column 15, lines 1-67).

Claim 21:

The claim 21 encompasses the same scope of invention as that of claim 1 except additional claimed limitation of a thresholding module to disregard pixel data for each of the pixels having a product of a saturation coordinate and a value coordinate below a predetermined threshold amount. However, Bradski further discloses the claimed limitation of a thresholding module to disregard pixel data for each of the pixels having a product of a saturation coordinate and a value coordinate below a predetermined threshold amount (figures 3A, 3B, 4-5; column 4, lines 1-57; column 13, lines 55-67; column 14, lines 1-59).

Claim 22:

The claim 22 encompasses the same scope of invention as that of claim 1 except additional claimed limitation of the calibration window being smaller than the at least one image frame. However, Bradski further discloses the claimed limitation of the calibration window being smaller than the at least one image frame (figures 4, 10A-10B and 14A; column 6, lines 1-67; column 15, lines 1-67).

Art Unit: 2672

Claim 23:

The claim 23 encompasses the same scope of invention as that of claim 1 except additional claimed limitation of each of the adjacent test windows having a same size as the calibration window. However, Bradski further discloses the claimed limitation of each of the adjacent test windows having a same size as the calibration window (figures 4, 10A-10B and 14A; column 6, lines 1-67; figures 11-14, column 15, lines 1-67).

Claim 24:

The claim 24 encompasses the same scope of invention as that of claim 1 except additional claimed limitation of each of the adjacent test windows having at least one pixel overlapping with the calibration window. However, Bradski further discloses the claimed limitation of each of the adjacent test windows having at least one pixel overlapping with the calibration window (figures 4, 10A-10B and 14A; column 6, lines 1-67; figures 11-14, column 15, lines 1-67).

Claim 25:

The claim 25 encompasses the same scope of invention as that of claim 9 except additional claimed limitation of the calibration window being smaller than the at least one image frame. However, Bradski further discloses the claimed limitation of the calibration window being smaller than the at least one image frame (figures 4, 10A-10B, and 14A; column 6, lines 1-67; column 15, lines 1-67).

Claim 26:

The claim 26 encompasses the same scope of invention as that of claim 9 except additional claimed limitation of each of the adjacent test windows having a same size as the

Art Unit: 2672

calibration window. However, Bradski further discloses the claimed limitation of each of the adjacent test windows having a same size as the calibration window (figures 4, 10A, 10B and 14A; column 6, lines 1-67; figures 11-14, column 15, lines 1-67).

Claim 27:

The claim 27 encompasses the same scope of invention as that of claim 9 except additional claimed limitation of each of the adjacent test windows having at least one pixel overlapping with the calibration window. However, Bradski further discloses the claimed limitation of each of the adjacent test windows (the moving search windows) having at least one pixel overlapping with the calibration window (figures 4, 10A-10B; column 6, lines 1-67; figures 11-14, column 15, lines 1-67).

Claim 28:

The claim 28 encompasses the same scope of invention as that of claim 9 except additional claimed limitation of creating a pixel-classification look-up map for the HSV data array of pixels. However, Bradski further discloses the claimed limitation of creating a pixel-classification look-up map for the HSV data array of pixels (figures 4, 10A and 10B; column 4, lines 2-57; column 6, lines 5-35).

Remarks

11. Applicant's arguments, filed 06/06/2003, paper number 3, have been fully considered but they are not deemed to be persuasive.
12. Applicant argues in essence with respect to claim 1 and the newly added claims that:

Art Unit: 2672

“However, Bradski, does not disclose, teach, or suggest use of an automated calibration system to track a selected object through a series of frames of data, the automated calibration system including...”

This is not found persuasive for the reasons given below.

The examiner asserts that the claims are unpatentable over Bradski in the cited reference. Bradski teaches all the claimed limitations set forth in the amendment. In response to the claimed limitation set forth in claim 1,

Bradski teaches an automated calibration system (figure 1; column 3, lines 34-55) to track a selected object through a series of frames of data (column 7, lines 55-65), comprising:

- (a) A display device (e.g., figure 11) to display at least one image frame received from an image input device, wherein the image frame includes a calibration window (column 4, lines 2-60; column 15, lines 13-58; figures 4, 10A and 10B);
- (b) An image selection device to select, via the calibration window, the selected object in the at least one image frame (column 3, lines 59-67, column 4, lines 1-10, and column 7, lines 33-54; column 15, lines 13-58);
- (c) An image source device (video source 1102 of figure 11) to provide a hue saturation value (HSV) data array of pixels forming the at least one image frame (column 4, lines 2-57; column 13, lines 45-52; column 15, lines 13-58; figures 3A and 3B); and
- (d) An analysis module (the flow diagrams of figures 5, 7 and 9; column 13, lines 55-67; column 14, lines 1-59) to determine analysis data for pixels (column 4, lines 2-57; figures 4, 3A and 3B) within the calibration window (column 5, lines 52-67; column 6, lines 1-

Art Unit: 2672

44; column 15, lines 13-58; figures 4, 10A and 10B), based on the HSV data array (column 4, lines 2-57; figures 3A and 3B), and determine test analysis data (e.g., window sizing parameters) for a set of adjacent test windows (e.g., search windows or boxes or windows of FIG. 14A displaying images; column 5, lines 52-67; column 6, lines 1-44; column 15, lines 13-58), each of the adjacent test windows having a same shape as the calibration window (e.g., the entire video frame or a search window; column 15, lines 13-58), wherein tracking data, to track the selected object (e.g., the selected gestures), is selected from one of the calibration window and the adjacent test windows having a highest tracking probability (i.e., the tracking data such as window location parameters are determined/adjusted and a search window having the largest connected region of a probability distribution and the highest probability density is selected, column 6, lines 45-67; column 7, lines 55-67; column 8, lines 1-9; column 15, lines 13-58).

Therefore, Bradski fulfills the claim 1 as currently drafted.

Conclusion

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

Art Unit: 2672

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

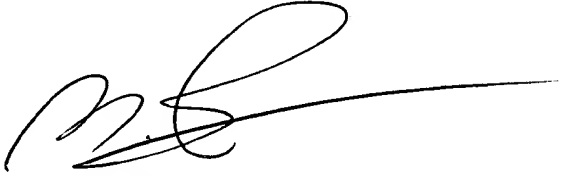
14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jin-Cheng Wang whose telephone number is (703) 605-1213.

The examiner can normally be reached on 8:00 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Razavi can be reached on (703) 305-4713. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-6606 for regular communications and (703) 308-6606 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 395-3900.

jcw
June 19, 2003



MICHAEL RAZAVI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600